

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA22 | Whittington to Handsacre

Data appendix (AG-001-022)

Agriculture, forestry and soils

November 2013

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1 Introduction

1.1.1 The agriculture, forestry and soils appendices for the Whittington to Handsacre community forum area (CFA22) comprise:

- Soils and agricultural land classification surveys (Section 2);
- Forestry (Section 3); and
- Farm impact assessment summaries (Section 4).

1.1.2 Maps referred to throughout the agriculture, forestry and soils appendix are contained in the Volume 5 agriculture, forestry and soils map book.

2 Soils and agricultural land classification surveys

2.1 Background

- 2.1.1 The soils and agricultural baseline conditions reported have been established from desktop studies and site surveys.
- 2.1.2 Information gathered by desktop studies has related primarily to the identification of soil resources in the study area, the associated physical characteristics of geology, topography and climate which underpin the assessment of agricultural land quality, and the disposition of land uses. The main sources of information have included:
- National Soil Map¹;
 - Soils and Their Use in Midland and Western England²;
 - Soils in Staffordshire IV Sheet SK00/10 (Lichfield)³;
 - Solid and superficial deposits from the Geology of Britain viewer⁴;
 - Gridpoint meteorological data for Agricultural Land Classification of England and Wales⁵;
 - Provisional Agricultural Land Classification of England and Wales (1:250,000)⁶;
 - Likelihood of Best and Most Versatile Agricultural Land (1:250,000)⁷;
 - Agri-environment schemes⁸;
 - Aerial photography from Google Earth; and
 - On-site soil and Agricultural Land Classification surveys.
- 2.1.3 Information gathered by field survey⁹ has related to the enhancement of desk-based information on soils and agricultural land quality, and the engagement with landowners and tenants to establish the nature and extent of agricultural, forestry and related rural enterprises.
- 2.1.4 Field and other data were interpreted using the MAFF's 1988 Revised Guidelines and Criteria for Grading the Quality of Agricultural Land¹⁰.

¹ Cranfield University (2001), *The National Soil Map of England and Wales 1:250,000 scale*. Cranfield University: National Soil Resources Institute.

² Soil Survey of England and Wales (1984), *Soils and Their Use in Midland and Western England*. Harpenden.

³ Hollis J.M. (1985), *Soils in Staffordshire IV Sheet SK00/10 (Lichfield)*, Soil Survey Record No. 89, Harpenden.

⁴ British Geological Survey. <http://bgs.ac.uk/geologyofbritain/home/html>.

⁵ Meteorological Office (1989), *Gridpoint Meteorological data for Agricultural Land Classification of England and Wales and other Climatological Investigations*.

⁶ Ministry of Agriculture, Fisheries and Food (1983), *Agricultural Land Classification of England and Wales (1:250,000)*.

⁷ Department for Environment, Food and Rural Affairs (2005), *Likelihood of Best and Most Versatile Agricultural Land (1:250,000)*.

⁸ Multi-Agency Geographical Information for the Countryside (MAGIC) available on line @ www.magic.gov.uk.

⁹ Hodgson, J.M. (1997), *The Soil Survey Field Handbook*. Soil Survey Technical Monograph no. 5, Silsoe.

¹⁰ Ministry of Agriculture, Fisheries and Food (1988), *Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land*.

- 2.1.5 Information obtained from farm impact assessment interview surveys has been taken as a factual representation of local agricultural and forestry interests and has not been subject to further evaluation.

2.2 Soils and land resources

- 2.2.1 This part of the technical appendix describes the findings of a desktop study and targeted soil survey and Agricultural Land Classification (ALC) survey that identified existing soil and agricultural land resources in the study area.

- 2.2.2 The location and extent of different soil types and agricultural land in the different ALC grades are influenced by topography and drainage, and by geology and soil parent materials, which are described in turn in the following sections. This section then provides a description and distribution of the main soil types encountered along the study corridor.

Topography and drainage

- 2.2.3 The proposed route through this area extends northwards from the A51 at Whittington Heath over dissected sandstone country, falling from 100m above Ordnance Datum (AOD) on the Whittington Heath Golf Club to 65m AOD on the floodplain near Huddlesford. From there, the route proceeds north-westwards across lowlands at 65m to 75m AOD before rising slightly west of Bourne Brook.
- 2.2.4 Drainage is served by north-east flowing brooks at Huddlesford and branches of the Mare Brook around Streethay which are tributaries of the River Tame. Further west, the Curborough and Bourne Brooks, fed by numerous smaller brooks and drains, flow towards the River Trent to the north of Handsacre.

Geology and soil parent materials

- 2.2.5 Superficial Deposits are present intermittently along the Proposed Scheme. River Terrace Deposits (sands and gravels) surround a surface watercourse to the south-west of Fradley Park. Glaciofluvial Sheet Deposits (comprising sand and gravel with lenses of clay, silt and organic material) underlie the Proposed Scheme almost continuously from Gorse Farm at Fradley to the northern end of the study area.
- 2.2.6 Narrow strips of Illuvium (comprising clay, silt, sand and gravel) are present around the channel of an unnamed brook located between Mill Farm and the Wyrley and Essington Canal and also around Pyford Brook situated to the north-west of Fradley Park. Head Deposits, variably comprising clay, silt, sand and gravel resulting from downslope movement, are present to the north of Streethay.
- 2.2.7 British Geological Survey (BGS) information shows that bedrock of the Triassic period underlies the Proposed Scheme. Bedrock of the Triassic period underlies the Proposed Scheme. The Sherwood Sandstone Group, (comprising the Bromsgrove Sandstone Formation and Kidderminster Formation) is comprised of pebbly, gravelly sandstone, and is present from the southern end of the study area as far north as Hill Farm at Streethay. The Mercia Mudstone Group, described as red and green-grey, mudstones and subordinate siltstones with widespread thin beds of gypsum/anhydrite, underlies the Proposed Scheme from Hill Farm to the northern end of the study area.

- 2.2.8 A list of geological strata occurring within the study area is provided in age order in Table 1 and shown on Map WR-02-022 (Volume 5).

Table 1: Bedrock and soil forming materials

Formation	Composition/soil parent material
Superficial deposits	
Glaciofluvial Sheet Deposits	Sand and Gravel
Alluvium	Clay, silt, sand and gravel
Undifferentiated deposits (Head)	Clay, Silt, Sand and Gravel
River Terrace Deposits	Sand and Gravel
Bedrock	
Kidderminster Formation	Conglomerates and sandstones
Bromsgrove Sandstone Formation	Sandstones, commonly pebbly or conglomeratic at the bases of beds, interbedded siltstones and mudstones
Mercia Mudstone Group	Mudstones and subordinate siltstones

Description and distribution of soil types

- 2.2.9 The characteristics of the soils are described by the Soil Survey of England and Wales that accompanies the National Soil Map. A more detailed soil map and report are available for the southernmost 3km of the Whittington to Handsacre area in the Soil Survey's Soils in Staffordshire IV, SK00/10 Lichfield (Hollis 1985). The soils are grouped into soil associations of a range of soil types (soil series) and are summarised in Table 2, and their distribution is shown on Map AG-02-22.

Table 2: Soil associations

Soil association: code shown on Map AG-02-22	Soil association: name	Description	Wetness class
541b	Bromsgrove	Well drained reddish sandy loam soils mainly over sandstone, deep in places; some clay loam soils with slowly permeable subsoils and slight seasonal waterlogging	I-II
551a	Bridgnorth	Well drained sandy and sandy loam soils over soft sandstone, deep in places	I
551d	Newport 1	Deep well drained sandy and sandy loamy soil, with some sandy and sandy loam soils affected by groundwater with slight seasonal waterlogging, and loamy soils with slowly permeable subsoils and seasonal waterlogging	I-III
711b	Brockhurst 1	Slowly permeable seasonally waterlogged reddish clay loam over clayey soils, with some similar soils with slowly permeable subsoils and slight seasonal waterlogging	III
711n	Clifton	Slowly permeable seasonally waterlogged reddish clay loam and sandy loam soils, and similar soils with slight seasonal waterlogging; some deep sandy loam soils seasonally affected by groundwater	II-III
821b	Blackwood	Deep permeable sandy and sandy loam soils; groundwater controlled by ditches	I-III

Soil association: code shown on Map AG-02-22	Soil association: name	Description	Wetness class
831c	Wigton Moor	Permeable clay loam and sandy loam soils variably affected by groundwater	I-III

2.2.10 The National Soil Map shows seven principal soil types within this area. Narrow strips of alluvium flanking brooks are too small in extent to be distinguished on the published soil maps.

- Bromsgrove association is mapped on part of the Bromsgrove Sandstone Formation between Darnford Lane, Whittington and the A38 at Streethay. The dominant soil type, Bromsgrove series, is a permeable, well drained reddish sandy loam over sandstone, deep in places. These free draining soils are in Wetness Class¹¹ (WC) I. There are also some associated sandy loam soils with slowly permeable subsoils sandstone that experience slight seasonal waterlogging (WC II);
- Bridgnorth association has well drained (WC I) sandy and sandy loam soils over soft sandstone, deep in places; it occurs in the south of the area on Whittington Heath on the Kidderminster Formation;
- dominantly deep sandy and sandy loam soils of the Newport 1 association occur in glaciofluvial sand and gravel deposits at the north-western end of the proposed route from Bourne Brook to Handsacre, including the Y junction with the West Coast Main Line (WCML). The soils are generally well drained (WC I), but surveys for this project show that soils also occur with slight seasonal waterlogging from fluctuating groundwater (WC II), and with seasonal waterlogging where slowly permeable clayey and loamy layers occur in the subsoil ;
- short stretches of the proposed route cross soils of the similar Brockhurst 1 and Clifton associations, the former developed on mudstones with thin superficial drift west of Huddlesford and the latter near East Hill in deep reddish sandy loam, sandy silt loam and clay loam textured drift. Topsoils and upper subsoils tend to be medium clay loam or silty clay loam, but the slowly permeable clayey or loamy lower subsoils cause the dominant soils to be seasonally waterlogged (WC III-IV);
- over 3km of the proposed route between Fradley and Bourne Brook has deep permeable sandy and sandy loam y soils in the Blackwood association, affected by groundwater (WC I-III) ; and
- soils on river terrace deposits and Head in the Mare Brook catchment north and east of Streethay are mapped as Wigton Moor association of deep sandy loam and medium clay loams, variably affected by groundwater (WC II-III).

¹¹ The Wetness Class (WC) of a soil is classified in Appendix II of Hodgson, J.M. (1977), *The Soil Survey Field Handbook*. Soil Survey and Land Research Centre, Technical Monograph No.5, according to the depth and duration of waterlogging in the soil profile and has six bands ranging from Wetness Class I (well drained) to Wetness Class VI (permanently waterlogged).

2.3 Soils and land resources

Agricultural land quality

- 2.3.1 A review of available ALC information has been undertaken to ascertain the land quality within the study area. Detailed ALC surveys for an extensive area between around Streethay and Fradley are available on MAGIC. High confidence levels have also been gained in this CFA from assessing land quality from a detailed soil survey (Hollis 1985), and from field surveys for this project.
- 2.3.2 In areas where access to land was not granted to access sites, ALC has been assessed from available information in the form of archived Soil Survey records obtained from the National Soil Resources Institute (NSRI) at Cranfield University. In areas where land access was not granted and no archived records were available, a professional judgement was made using published soil maps geological information.

Detailed agricultural land classification

- 2.3.3 Seventy five new auger bores were made in the area affected by HS2. In addition, eleven archived auger bore records were obtained from NSRI, bringing the total number of auger bore logs to 86.
- 2.3.4 Farms on which soil surveys were undertaken in 2102 and 2013 are: CFA22/10 Land around Fradley Wood, CFA22/15 Hauchwood Farm, CFA22/16 Brownfields Farm, CFA22/17 Hunts Farm, CFA22/18 New Farm, Elmhurst and CFA22/20 Tuppenhurst Field. In addition, CFA21/15 Freeford Farm, which spans the CFA22 boundary, was surveyed.
- 2.3.5 The principal physical factors influencing agricultural production and land quality are climate, site and soil, and the interactions between them.
- 2.3.6 Soil profiles were examined using an Edelman (Dutch) auger and a spade. Where soils were stony or dry a 2.5cm diameter screw auger was used to enable deeper penetration. At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120cm where possible, or to any impenetrable layer:
- soil texture;
 - significant stoniness;
 - colour (including local gley and mottle colours);
 - consistency;
 - structural condition;
 - free carbonate; and
 - depth.
- 2.3.7 Soil available water capacity, relevant to the assessment of drought risk, was estimated from texture, structure, organic matter content, stone content and profile depth.

Agro-climatic limitations

- 2.3.8 The local climatic factors have been interpolated from the Meteorological Office's database (Met Office 1989) held in the Landis climatic database at Cranfield University¹² at 1km intervals along the line of the track. The average of the parameters is given in Table 3. There is little variation across the CFA: FCDs are within the narrow range 154 to 166 days; average annual rainfall (AAR) is from 687mm to 712mm; moisture deficits are 98mm to 100mm for wheat and 87mm to 90mm for potatoes.

Table 3: Interpolated agro-climatic data

Climatic parameter	Whittington Heath SK1476 0753	Black Slough Farm SK1250 1369	Shaw Lane SK1044 1433
Altitude (m)	90	72	78
Average annual rainfall (mm)	687	694	712
Accumulated Temperature >0°C (Jan-June)	1375	1393	1386
Field Capacity Days (days)	154	158	166
Average Moisture Deficit, wheat (mm)	98	100	98
Average Moisture Deficit, potatoes (mm)	88	90	87

- 2.3.9 Climate itself does not place any limitation upon the land in this part of the West Midlands, but the interactions of climate with soil characteristics are important in determining the wetness and droughtiness limitations of the soil.
- 2.3.10 The influence of climate on soil wetness is assessed by reference to median Field Capacity Days (FCD) when the soil moisture deficit is zero, WC and topsoil texture (MAFF 1988 Table 6). Soil WC was inferred from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling and/or poorly permeable subsoil layers at least 15cm thick.
- 2.3.11 The ALC grade according to soil wetness was determined by following the methodology set out in the ALC Guidelines (October, 1988) and the information in the Table 4.

Table 4: ALC grade according to soil wetness – mineral soils (based on Table 6 of ALC Guidelines, October 1988)

Wetness class	Texture ¹ of the top 25cm	Field capacity days				
		<126	126-150	151-175	176-225	>225
I	S ² LS ³ SL SZL	1	1	1	1	2
	ZL MZCL MCL SCL	1	1	1	2	3a
	HZCL HCL	2	2	2	3a	3b
	SC ZC C	3a(2)	3a(2)	3a	3b	3b
II	S ² LS ³ SL SZL	1	1	1	2	3a
	ZL MZCL MCL SCL	2	2	2	3a	3b
	HZCL HCL	3a(2)	3a(2)	3a	3a	3b

¹² <http://archive.defra.gov.uk/foodfarm/landmanage/land-use/documents/alc-guidelines-1988.pdf> Accessed: August 2103.

Wetness class	Texture ¹ of the top 25cm	Field capacity days				
		<126	126-150	151-175	176-225	>225
	SC ZC C	3a(2)	3b(3a)	3b	3b	3b
III	S ² LS SL SZL	2	2	2	3a	3b
	ZL MZCL MCL SCL	3a(2)	3a(2)	3a	3a	3b
	HZCL HCL	3b(3a)	3b(3a)	3b	3b	4
	SC ZC C	3b(3a)	3b(3a)	3b	4	4
IV	S ² LS SL SZL	3a	3a	3a	3b	3b
	ZL MZCL MCL SCL	3b	3b	3b	3b	3b
	HZCL HCL	3b	3b	3b	4	4
	SC ZC C	3b	3b	3b	4	5
V	S LS SL SZL	4	4	4	4	4
	ZL MZCL MCL SCL	4	4	4	4	4
	HZCL HCL	4	4	4	4	4
	SC ZC C	4	4	4	5	5

Soils in Wetness Class VI – Grade 5

Texture key: S – sand; LS – loamy sand; SL – sandy loam; SZL – sandy silt loam; ZL – silt loam; MZCL – medium silty clay loam; MCL – medium clay loam; SCL – sandy clay loam; HZCL – heavy silty clay loam; HCL – heavy clay loam; SC – sandy clay; ZC – silty clay; C – clay

¹ For naturally calcareous soils with more than 1% CaCO₃ and between 18% and 50% clay in the top 25cm, the grade, where different from that of other soils, is shown in brackets.

² Sand is not eligible for Grades 1, 2 or 3a.

³ Loamy sand is not eligible for Grade 1.

2.3.12 Droughtiness is determined by comparing crop-adjusted available water (AP), with the moisture deficit (MD) for the locality for wheat and potatoes (MAFF 1988 Appendix 4). Grading of the land can be affected if the AP is insufficient to balance the MD and droughtiness occurs. The availability of irrigation can improve grading by 1 division where appropriate. However, irrigation is not common practice for grass cereals and oil seed rape (OSR). The calculation used in the ALC Guidelines (October, 1988)¹⁰ to determine the severity of this limitation is given below in Figure 1.

Figure 1: Methodology for calculating the severity of a droughtiness limitation to ALC grading (derived from MAFF, 1988)

$$AP \text{ wheat (mm)} = \frac{TA_{vt} \times LT_t + \sum (TA_{vs} \times LT_{50}) + \sum (EA_{vs} \times LT_{50-120})}{10}$$

where

TA_{vt} is Total available water (TA_v) for the topsoil texture

TA_{vs} is Total available water (TA_v) for each subsoil layer

EA_{vs} is Easily available water (EA_v) for each subsoil layer

LT_t is thickness (cm) of topsoil layer

LT_{50} is thickness (cm) of each subsoil layer to 50 cm depth

LT_{50-120} is thickness (cm) of each subsoil layer between 50 and 120 cm depth

Σ means 'sum of'.

$$AP \text{ potatoes (mm)} = \frac{TA_{vt} \times LT_t + \sum (TA_{vs} \times LT_{70})}{10}$$

where

LT_{70} is thickness (cm) of each subsoil layer to 70 cm depth

MB (Wheat) = AP (Wheat) - MD (Wheat)

MB (Potatoes) = AP (Potatoes) - MD (Potatoes)

Where

MB is the Moisture Balance

AP is the Crop-adjusted available water capacity

MD is the moisture deficit, as determined by the agro-climatic assessment.

Table 8 Grade according to droughtiness

Grade/ Subgrade	Moisture Balance limits (mm)		
	<i>wheat</i>		<i>potatoes</i>
1	+30	<i>and</i>	+10
2	+5	<i>and</i>	-10
3a	-20	<i>and</i>	-30
3b	-50	<i>and</i>	-55
4	<-50	<i>or</i>	<-55

Site limitations

- 2.3.13 The assessment of site factors is primarily concerned with the way in which topography influences the use of agricultural machinery and, hence, the cropping potential of land. Gradient and micro relief, with complex changes of slope angle or direction over short distances, are not considered limiting in the study area. Flooding may occur on some narrow floodplains of brooks (such the Bourne Brook) but it's very small extent and limited frequency means it is not significant in terms of ALC.

Soil limitations

- 2.3.14 The main soil properties which affect the cropping potential and management requirements of land are texture, structure, depth, stoniness and chemical fertility. Together they influence the functions of soil and affect the water availability for crops, and soil drainage, workability and trafficability. Soils within the area often have sandy and sandy loam textures, and in some places are stony, especially over sandstone of the Kidderminster and Bromsgrove Sandstone Formations. Poor soil structure in slowly permeable subsoils is a limitation on mudstones, and there is fluctuating groundwater in permeable soils in valleys and in the extensive, spread of low-lying glaciofluvial deposits. Soil depth is a limitation where soils are thin over hard sandstone. Chemical limitations are not encountered in the study area.

Interactive limitations

- 2.3.15 The physical limitations which result from interactions between climate, site and soil are soil wetness, droughtiness and erosion. Each soil can be allocated a WC based on soil structure, evidence and depth of waterlogging and the number of FCDs; where soil droughtiness is not a problem the topsoil texture and stone content then determines its ALC Grade. Thus where there are 154 to 166 FCDs then a typical soil in the Brockhurst 1 association with a WC of III will be Subgrade 3a if the topsoil texture is a medium clay loam, and Subgrade 3b if it is a heavy clay loam.
- 2.3.16 Soil texture and structure determine the available water capacity of the soil profile. When calculated against the demands of a growing wheat and potato crop in the locality given by the climatic variable, the moisture deficit, a moisture balance is produced, from which a droughtiness limitation can be assessed. The clay loam and silty clay loam over clayey soils of the Brockhurst 1 association and the deep clay loams and silty clay loams of the Clifton association have sufficient moisture reserves in an average year to have no droughtiness limitation, or only one that limits the land to Grade 2. Light textured soils of the Bromsgrove, Bridgnorth and Newport 1 associations, however, tend to have a smaller available water capacity; dominantly sandy loam soils are Grade 2 or Subgrade 3a depending on the stone content, and sandy soils are Subgrade 3a or 3b, again depending on the stone content. Where irrigation facilities are available, and it is a current or recent practice, this is taken into account and may raise the Grade as the potential range and yield of crops (particularly horticultural and root crops) is increased.

Summary of ALC assessment in CFA22

- 2.3.17 The characteristics of the soil series encountered within each association and a summary of the key characteristics relevant to the ALC grading in CFA22 are given in Table 5 to Table 11.

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Table 5: Bromsgrove Association (541b)

Well drained sandy loam soils over soft sandstone but deep in places. Associated loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Risk of water erosion.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 166 min 154)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinants
					Wheat	Potatoes		
Bromsgrove		Bromsgrove Sandstone and Kidderminster Formation	160	I	99 (110-80)	89 (90-55)	2,3a or 3b*	Droughtiness
	Hodnet	Bromsgrove Sandstone Formation	160	II	99 (110-100)	89 (90-80)	2 or 3a	Droughtiness. Topsoil texture and wetness class locally.
	Eardiston**	Bromsgrove Sandstone and Kidderminster Formation	160	I	99 (110-80)	89 (90-55)	2, 3a or 3b*	Droughtiness

* Where subsoil texture is loamy sand and/or stone content is moderate to high then grade is restricted to 3a. Where shallow over rock may be Subgrade 3b

** Eardiston series is restricted to hill crests.

Brief Soil Profile Descriptions

Bromsgrove	Hodnet	Eardiston
0-30cm Ap Dark reddish brown, stoneless sandy loam 30-65cm Bw Reddish brown, stoneless sandy loam; weak medium or coarse subangular blocky structure 65-90cm BCu Reddish brown, stoneless or slightly stony sandy loam; single grain structure At 90cm Cu Soft weathered reddish brown sandstone	0-25cm Ap Dark reddish brown, very slightly stony sandy silt loam or clay loam 25-35cm Eb Reddish brown, very slightly stony; weak coarse subangular blocky structure 35-60cm Bt(g) Reddish brown, mottled, stoneless or slightly stony; moderate prismatic or angular blocky structure 60-100cm Cg Dark reddish brown, clay loam; massive structure 100-120cm Cr Reddish brown silty shale and sandstone	0-25cm Ap Dark reddish brown, stoneless or slightly stony sandy loam or sandy silt loam 25-40cm Bw Reddish brown, slightly stony sandy loam; moderate medium angular blocky structure 40-60cm BCu Reddish brown slightly or moderately stony sandy loam; weak coarse angular blocky structure or single grain At 60cm R Dark reddish grey hard bedded micaceous sandstone,

Table 6: Bridgnorth Association (551a)

Well drained sandy and sandy loam soils over soft sandstone. Occasional deeper soils. Risk of water and wind erosion

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 166 min 154)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinant
					Wheat	Potatoes		
Bridgnorth		Bromsgrove Sandstone and Kidderminster Formation	160	I	99 (90-60)	89 (75-50)	3a or 3b*	Droughtiness
	Bromsgrove	Bromsgrove Sandstone Formation	160	I	99 (110-90)	89 (90-65)	2 or 3a	Droughtiness
	Newport	Glaciofluvial sands and gravels and river terrace deposits	160	I	99 (105-60)	89 (90-50)	2, 3a or 3b*	Droughtiness

* Where subsoil texture is sand and/or stone content is moderate to high then grade is restricted to 3b by drought.

Brief Soil Profile Descriptions

Bridgnorth	Bromsgrove	Newport
0-25cm Ap Dark reddish brown, stoneless loamy sand	0-30cm Ap Dark reddish brown, stoneless sandy loam	0-25cm Ap Dark brown, slightly stony sandy loam or loamy sand
25-50cm Bw Reddish brown, stoneless loamy sand or sand; weak medium subangular blocky structure or single grain	30-65cm Bw Reddish brown, stoneless sandy loam; weak medium or coarse subangular blocky structure	25-55cm Bw Brown, slightly stony loamy sand; weak fine subangular blocky structure
50-60cm Cu Reddish brown, slightly stony sand; single grain structure	65-90cm BCu Reddish brown, stoneless or slightly stony sandy loam; single grain structure	55-120cm Cu Yellowish red or brownish yellow slightly or moderately stony loamy sand or sand; single grain structure
At 60cm Cr Reddish brown sandstone	At 90cm Cu Soft weathered reddish brown sandstone	

Appendix AG-001-022 | Soils and agricultural land classification surveys

Table 7: Newport 1 Association (551d)

Deep well drained sandy and sandy loam soils. Some sandy soils affected by groundwater. Risk of wind and water erosion

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 166 min 154)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinant
					Wheat	Potatoes		
Newport		Glaciofluvial sands and gravels and river terrace deposits	160	I	99 (105-60)	89 (90-50)	2 or 3b*	Droughtiness
	Wick	Glaciofluvial sands and gravels and river terrace deposits	160	I	99 (105-60)	89 (90-50)	2 or 3a	Droughtiness
	Blackwood	Glaciofluvial sands and gravels and river terrace deposits	160	I-II	99 (105-80)	89 (90-65)	2 or 3a*	Droughtiness

* Where subsoil texture is sand and or stone content is moderate to high then grade may be restricted to 3b by drought.

Brief Soil Profile Descriptions

Newport	Wick	Blackwood
<p>0-25cm Ap Dark brown, slightly stony sandy loam or loamy sand</p> <p>25-55cm Bw Brown, slightly stony loamy sand; weak fine subangular blocky structure</p> <p>55-120cm Cu Yellowish red or brownish yellow slightly or moderately stony loamy sand or sand; single grain structure</p>	<p>0-25cm Ap Dark brown, slightly stony sandy loam</p> <p>25-50cm Bw1 Dark yellowish brown, slightly to moderately stony sandy loam; moderate to weak medium subangular blocky structure</p> <p>50-80cm Bw2 Yellowish brown slightly or moderately stony sandy loam or loamy sand; weak medium angular blocky structure or single grain</p> <p>80-120cm Cu Brownish yellow, slightly or moderately stony loamy sand or sandy loam; single grain structure</p>	<p>0-25cm Ap Very dark greyish brown, slightly stony sandy loam or loamy sand</p> <p>25-40cm Bg1 Pale brown, mottled, slightly stony loamy sand; weak medium and coarse subangular blocky structure</p> <p>40-90cm Bg2 Light brownish grey, mottled slightly stony; weak medium subangular blocky or single grain structure</p> <p>90-120cm Cg Greyish brown mottled slightly stony sand; single grain structure</p>

Table 8: Brockhurst 1 Association (711b)

Slowly permeable seasonally waterlogged reddish loamy over clayey soils and clayey soils. Some similar soils with slowly permeable subsoils and slight seasonal waterlogging.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 166 min 154)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinants
					Wheat	Potatoes		
Brockhurst		Mercian Mudstone Group	160	III	99 (120)	89 (105)	3a or 3b**	Topsoil texture and wetness class
	Whimble*	Mercian Mudstone Group	160	III	99 (115)	89 (105)	3a or 3b**	Topsoil texture and wetness class
	Salop*	Till, Glaciolacustrine sands and gravels	160	III	99 (115)	89 (105)	3a or 3b**	Topsoil texture and wetness class

*Whimble and Salop series are local inclusions in this association ** Where Subgrade is 3b the topsoil texture is heavy clay loam

Brief Soil Profile Descriptions

Brockhurst	Whimble	Salop
0-20cm Ap Dark brown very slightly stony medium clay loam	0-25cm Ap Dark brown slightly stony medium clay loam	0-25cm Ap Very dark greyish brown slightly stony medium clay loam
20-40cm Eg Brown, mottled slightly stony medium clay loam; moderate medium subangular blocky structure	25-40cm Eb(g) Reddish brown, slightly mottled, slightly stony clay loam; moderate medium subangular blocky structure	25-45cm Eg Brownish grey, mottled, slightly stony clay loam; moderate medium subangular blocky structure
40-75cm Btg Reddish brown, mottled stoneless or very slightly stony clay; strong coarse prismatic structure	40-60cm Bt(g) Reddish brown, slightly mottled, slightly stony clay loam; moderate to coarse prismatic structure	45-100cm Btg Yellowish red, mottled, slightly stony; moderate to weak coarse prismatic structure
75-100cm BCtg Reddish brown mottled stoneless clay moderate coarse prismatic structure	60-100cm 2BCtg Reddish brown, mottled, stoneless clay; Coarse prismatic structure	100-120cm BCtg Reddish brown, mottled, slightly stony clay; massive structure
At 100cm Reddish mudstone	At 100cm Reddish mudstone	

Appendix AG-001-022 | Soils and agricultural land classification surveys

Table 9: Clifton Association (711n)

Slowly permeable seasonally waterlogged reddish loamy and loamy over clayey soils. Some deep sandy loam soils affected by groundwater.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 166 min 154)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinants
					Wheat	Potatoes		
Clifton*		Glaciofluvial sands and gravels and river terrace	160	III	99 (125)	89 (110)	3a or 3b**	Topsoil texture and wetness class
	Salwick	Glaciofluvial sands and gravels and river terrace	160	II	99 (125)	89 (110)	2	Topsoil texture and wetness class
	Quorndon	Glaciofluvial sands and gravels and river terrace	160	II-III	99 (125-100)	89 (95-85)	2 or 3a	Droughtiness. Topsoil texture and wetness class locally

*Locally inclusions of soils with sandy loam or sandy silt loam topsoils are similar to Claverley series

** Where Subgrade is 3b the topsoil texture is heavy clay loam

Brief Soil Profile Descriptions

Clifton	Salwick	Quorndon
0-25cm Ap Dark greyish brown slightly stony clay loam or sandy clay loam	0-25cm Ap Dark brown slightly stony sandy loam or sandy clay loam	0-25cm Ap Dark brown, slightly stony sandy loam
20-35cm Eg Greyish brown, mottled slightly stony clay loam or sandy clay loam; weak medium subangular blocky structure	25-40cm Eb(g) Brown, slightly mottled, slightly stony clay loam or sandy loam; weak subangular blocky structure	25-50cm Bg1 Yellowish brown, mottled, slightly to moderately stony; weak medium subangular blocky structure
35-80cm Btg Reddish brown, mottled, slightly stony clay loam or sandy clay loam; moderate coarse prismatic structure	40-700cm Bt(g) Reddish brown, slightly mottled, slightly stony clay loam; weak coarse prismatic structure	50-80cm Bg2 Yellowish brown, mottled, slightly to moderately stony weak coarse subangular blocky or single grain structure
80-120cm BCtg Reddish brown mottled slightly stony clay loam weak coarse prismatic or massive structure	700-120cm BCtg Reddish brown, mottled, slightly stony clay loam; massive structure	80-120cm Cg Pale to yellowish brown, mottled slightly to moderately stony loamy sand or sandy loam; single grain structure

Table 10: Blackwood Association (821b)

Deep permeable sandy and sandy loam soils affected by fluctuating groundwater. Groundwater controlled by ditches.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 166 min 154)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinants
					Wheat	Potatoes		
Blackwood		Glaciofluvial sands and gravels and river terrace	160	I-III	99 (105-80)	89 (90-65)	2 or 3a	Droughtiness. Topsoil texture and wetness class locally
	Quorndon	Glaciofluvial sands and gravels and river terrace	160	II-III	99 (105-80)	89 (90-65)	2 or 3a	Droughtiness. Topsoil texture and wetness and wetness class locally
	Ollerton	Glaciofluvial sands and gravels and river terrace	160	II-III	99 (105-80)	89 (90-65)	2 or 3a	Droughtiness. Topsoil texture and wetness class locally

Brief Soil Profile Descriptions

Blackwood	Quorndon	Ollerton
0-25cm Ap Very dark greyish brown, slightly stony sandy loam or loamy sand	0-25cm Ap Dark brown, slightly stony sandy loam	0-25cm Ap Dark brown, stoneless or slightly stony sandy loam or loamy sand
25-40cm Bg1 Pale brown, mottled, slightly stony loamy sand; weak medium and coarse subangular blocky structure	25-50cm Bg1 Yellowish brown, mottled, slightly to moderately stony; weak medium subangular blocky structure	25-50cm Bw(g) Dark yellowish brown, slightly mottled, slightly stony loamy sand; weak fine subangular blocky structure
40-90cm Bg2 Light brownish grey, mottled slightly stony; weak medium subangular blocky or single grain structure	50-80cm Bg2 Yellowish brown, mottled, slightly to moderately stony weak coarse subangular blocky or single grain structure	50-90cm Bg Light brown, mottled, slightly stony sand; weak subangular blocky structure or single grain
90-120cm Cg Greyish brown mottled slightly stony sand; single grain structure	80-120cm Cg Pale to yellowish brown, mottled slightly to moderately stony loamy sand or sandy loam; single grain structure	90-120cm Cg Greyish brown, mottled, slightly stony sand; single grain structure

Appendix AG-001-022 | Soils and agricultural land classification surveys

Table 11: Wigton Moor Association (831c)

Permeable loamy soils variably affected by groundwater, the drier soils being on slightly raised sites. Generally flat land.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 166 min 154)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinants
					Wheat	Potatoes		
Wigton Moor		Glaciofluvial sands and gravels and river terrace	160	III	99 125	89 100	3a	Topsoil texture and wetness class
	Quorndon	Glaciofluvial sands and gravels and river terrace	160	II-III	99 (105-80)	89 (90-65)	2 or 3a	Droughtiness. Topsoil texture and wetness class locally
	Arrow	Glaciofluvial sands and gravels and river terrace	160	II	99 (105-80)	89 (90-65)	2 or 3a*	Droughtiness

* Where subsoil texture is loamy sand and or stone content is moderate to high then grade is restricted to 3a by drought

Brief Soil Profile Descriptions

Wigton Moor	Quorndon	Arrow
<p>0-25cm Ap Dark greyish brown, slightly stony medium sandy clay loam or clay loam</p> <p>25-50cm Bg1 Brown mottled slightly stony sandy clay loam or clay loam; medium subangular blocky structure</p> <p>50-80cm Bg2 Greyish brown with many ochreous mottles, moderately stony sandy clay loam or clay loam; weak coarse subangular blocky structure</p> <p>80-120cm Cg Brownish grey with many ochreous mottles, moderately stony sandy loam or sandy clay loam; single grain structure</p>	<p>0-25cm Ap Dark brown, slightly stony sandy loam</p> <p>25-50cm Bg1 Yellowish brown, mottled, slightly to moderately stony; weak medium subangular blocky structure</p> <p>50-80cm Bg2 Yellowish brown, mottled, slightly to moderately stony weak coarse subangular blocky or single grain structure</p> <p>80-120cm Cg Pale to yellowish brown, mottled slightly to moderately stony loamy sand or sandy loam; single grain structure</p>	<p>0-25cm Ap Dark brown, slightly stony sandy loam</p> <p>25-50cm Bw Dark yellowish brown, slightly to moderately stony sandy loam; weak medium subangular blocky structure</p> <p>50-80cm Bwg Brown, slightly mottled, slightly or moderately stony sandy loam or loamy sand; weak coarse subangular blocky structure</p> <p>80-120cm BCg Brownish yellow, mottled, slightly or moderately stony loamy sand or sandy loam; single grain structure</p>

3 Forestry

- 3.1.1 Identification of forestry resources has primarily had regard to the National Forestry Inventory¹³.
- 3.1.2 The area of land under forestry (i.e. trees and woodland) within 2km either side of the route centre line has been determined using GIS and is shown in Table 12.

Table 12: Area of woodland within the study area and construction boundary

	Area of forestry land (ha)	Forestry land as a % of total land area
Forestry land in study area	267.3	5
Forestry land within construction boundary	20.5	9

- 3.1.3 Stands of woodland include Fulfen Wood in the south, Lyntus Wood just north of Curborough, and Brokendown Wood and Ravenshaw Woods in the north. Woodland is often situated on low ground affected by high groundwater (Blackwood association). As forestry land covers 5% of land in the study area, compared to the national average of 10%, the sensitivity of the forestry land resource in this study area is considered to be high, as set out in the SMR Addendum (see Volume 5: Appendix CT-001-000/2).

¹³ Forestry Commission (2001), *National Forest Inventory Woodland and Ancient Woodland (as updated)*.

4 Assessment of effects on holdings

- 4.1.1 The effects on holdings have been assessed according to the methodology set out in the SMR Addendum (Volume 5: Appendix CT-001-000/2). The nature of impacts considered comprises the temporary and permanent land required from the holding, the temporary and permanent severance of land, the permanent loss of key farm infrastructure and the imposition of disruptive effects (particularly noise and dust) on land uses and the holding's operations. These impacts occur primarily during the construction phase of the Proposed Scheme.

Table 13: Summary of assessment of effect on holdings

Holding reference, name and description	Construction effects	Residual effects post restoration of land
CFA22/1 Fulfen Farm 71.6ha of Mainly arable Medium sensitivity to change	Land required: 22.0ha; 31% of holding required for construction. High Impact Severance: parcel to NE severed from rest of holding. Access provisions under CoCP. Low Impact Disruptive effects: none identified. Low Impact	Land required: 1.8ha; 3% of holding taken. Negligible Impact Severance: parcel to NE severed from rest of holding. Severance mitigated by access under Fulfen Wood underbridge or off Park Lane. Low Impact Infrastructure: reinstatement of water supply/ drinking trough systems; restoration of drainage functionality; fencing. Negligible Impact
CFA22/2* Land off Capers Lane 30.6ha of Mixed arable and livestock Medium sensitivity to change	Land required: 11.0ha; 36% of holding required for construction. High Impact Severance: holding is severed by HS2 on both sides of Capers Lane. Access provisions under CoCP. Medium Impact Disruptive effects: noise likely to affect horse livery. Medium Impact	Land required: 9.1ha; 30% of holding taken. High Impact Severance: holding is severed by HS2 on both sides of Capers Lane. Access to severed parcels will be off Capers Lane. Medium Impact Infrastructure: reinstatement of water supply/ drinking trough systems; restoration of drainage functionality; fencing. Negligible Impact
CFA22/3 Huddlesford House Farm 323.8ha of Mixed arable and livestock (including dairy) High sensitivity to change	Land required: 32.6ha; 10% of holding required for construction (part of compound and material stockpile area). Medium Impact Severance: no severance (severed land required for construction). Negligible Impact Disruptive effects: proximity of construction to dairy herd. Low Impact	Land required: 4.8ha; 2% of holding taken. Negligible Impact Severance: land to west of HS2 is severed from the rest of the holding. Access is provided under Fulfen Wood underbridge. Low Impact Infrastructure: reinstatement of abstraction point, water supply / drinking trough systems and dirty water irrigation systems; restoration of drainage functionality; fencing. Negligible Impact

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA22/4</p> <p>Hill Farm Streethay</p> <p>28.3ha of Mixed arable and livestock</p> <p>Medium sensitivity to change</p>	<p>Land required: 23.6ha; 83% of holding required for compound and material stockpile area. Holding likely to be made unviable by extent of land take. High Impact</p> <p>Severance: no severance as holding likely to be made unviable by construction activity. Negligible Impact</p> <p>Disruptive effects: N.A (holding likely to be made unviable by construction activity). Low Impact</p>	<p>Land required: 6.3ha; 22% of holding taken. High Impact</p> <p>Severance: Footpath Streethay 6 underpass (184-S4) is not large enough for agricultural machinery – pedestrian and small vehicle access only. High Impact</p> <p>Infrastructure: loss of residential and agricultural buildings; reinstatement of water supply / drinking trough systems ; restoration of drainage functionality; fencing. High Impact</p>
<p>CFA22/5*</p> <p>Streethay Farm</p> <p>32.5ha of Mixed arable and livestock</p> <p>Medium sensitivity to change</p>	<p>Land required: 17.1ha; 53% of holding required for construction, compound and material stockpile area. Holding likely to be made unviable by extent of land take. High Impact</p> <p>Severance: no severance as holding made unviable by construction activity. Negligible Impact</p> <p>Disruptive effects: noise likely to affect horse livery. Medium Impact</p>	<p>Land required: 4.9ha; 15% of holding taken. Medium Impact</p> <p>Severance: land to east of HS2 is severed from the rest of the holding. Access is provided under Streethay Viaduct. Low Impact</p> <p>Infrastructure: loss of airfield buildings (diversified enterprise); reinstatement of water supply / drinking trough systems; restoration of drainage functionality; fencing. High Impact</p>
<p>CFA22/6*</p> <p>Streethay House Farm</p> <p>91.7ha of Mainly arable</p> <p>Medium sensitivity to change</p>	<p>Land required: 13.1ha; 14% of holding required for construction. Medium Impact</p> <p>Severance: eastern parcel severed from the remainder of holding. Access is available along the A5127 and will be arranged under CoCP. Medium Impact</p> <p>Disruptive effects: none identified. Low Impact</p>	<p>Land required: 12.8ha; 14% of holding taken. Medium Impact</p> <p>Severance: eastern parcel severed from the remainder of holding. Severance mitigated by access off A5127. Medium Impact</p> <p>Infrastructure: restoration of drainage functionality. Negligible Impact</p>
<p>CFA22/7*</p> <p>Curborough House Farm</p> <p>172.0ha of Mainly arable</p> <p>Medium sensitivity to change</p>	<p>Land required: 29.8ha; 17% of holding required for construction. Medium Impact</p> <p>Severance: small areas severed by road realignment and construction to the north of holding. Access arranged through CoCP. Medium Impact</p> <p>Disruptive effects: none identified. Low Impact</p>	<p>Land required: 28.3ha; 16% of holding taken. Medium Impact</p> <p>Severance: small areas severed by road realignments to the north of holding. Access off Wood End Lane and spur to depot. Medium Impact</p> <p>Infrastructure: restoration of drainage functionality; access provisions. Negligible Impact</p>

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA22/8</p> <p>Curborough Farm</p> <p>272.0ha of Mixed arable and livestock (sheep and cattle)</p> <p>High sensitivity to change</p>	<p>Land required: 28.9ha; 11% of holding required for construction. Medium Impact</p> <p>Severance: no severance because land that would have been severed is taken for construction activity. Negligible Impact</p> <p>Disruptive effects: disruption of customer access to diversified activities (e.g. tea room, fishing lakes) needs to be managed effectively under CoCP. Low Impact</p>	<p>Land required: 22.4ha; 8% of holding taken. Low Impact</p> <p>Severance: no severance because land that would have been severed is taken for ecological mitigation and permanent planting. Negligible Impact</p> <p>Infrastructure: reinstatement of abstraction point and water supply / drinking trough systems; restoration of drainage functionality; fencing; access provisions. Negligible Impact</p>
<p>CFA22/9</p> <p>Big Lyntus Wood</p> <p>6.7ha of Woodland</p> <p>Medium sensitivity to change</p>	<p>Land required: 0.0ha; 0% of holding required for construction. Negligible Impact</p> <p>Severance: none identified. Negligible Impact</p> <p>Disruptive effects: none identified. Low Impact</p>	<p>Land required: 0.0ha; 0% of holding taken. Negligible Impact</p> <p>Severance: none identified. Negligible Impact</p> <p>Infrastructure: none identified. Negligible Impact</p>
<p>CFA22/10</p> <p>Land around Fradley Wood</p> <p>1618.8ha of Mixed arable and livestock</p> <p>High sensitivity to change</p>	<p>Land required: 7.3ha; 1% of holding required for construction. Negligible Impact</p> <p>Severance: no severance because land that would have been severed is taken for construction activity. Negligible Impact</p> <p>Disruptive effects: none identified. Negligible Impact</p>	<p>Land required: 7.3ha; 1% of holding taken. Negligible Impact</p> <p>Severance: no severance because land that would have been severed is taken for ecological mitigation. Negligible Impact</p> <p>Infrastructure: reinstatement of irrigation mains. Negligible Impact</p>
<p>CFA22/11</p> <p>Riley Hill Woodend Farm</p> <p>60.0ha of Mainly arable</p> <p>High sensitivity to change</p>	<p>Land required: 7.3ha; 12% of holding required for construction. Medium Impact</p> <p>Severance: no severance because land that would have been severed is taken for construction activity. Low Impact</p> <p>Disruptive effects: access track adjacent to farm residence (alternative on construction plan is bridge over canal). Medium Impact</p>	<p>Land required: 7.1ha; 12% of holding taken. Medium Impact</p> <p>Severance: Access still needed to area of woodland outside of ecological mitigation area is provided under Pyford Brook Viaduct. Low Impact</p> <p>Infrastructure: reinstatement of abstraction point; restoration of drainage functionality; fencing. Negligible Impact</p>

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA22/12</p> <p>Ravenshaw Wood (East)</p> <p>15.0ha of Woodland</p> <p>Low sensitivity to change</p>	<p>Land required: 4.0ha; 27% of holding required for construction.</p> <p>High Impact</p> <p>Severance: although no formal access to severed woodland shown, infrequent access needed to maintain wood during construction period can be arranged under CoCP.</p> <p>Low Impact</p> <p>Disruptive effects: none identified.</p> <p>Low Impact</p>	<p>Land required: 3.9ha; 26% of holding taken.</p> <p>High Impact</p> <p>Severance: assumes access via Ravenshaw Cottage access track.</p> <p>Negligible impact</p> <p>Infrastructure: restoration of drainage functionality; fencing.</p> <p>Negligible Impact</p>
<p>CFA22/13</p> <p>Black Slough Farm</p> <p>56.0ha of Mainly livestock (dairy)</p> <p>High sensitivity to change</p>	<p>Land required: 19.8ha; 35% of holding required for construction. Land take of this scale probably makes dairy enterprise unviable.</p> <p>High Impact</p> <p>Severance: No severance because land that would have been severed is taken for construction activity.</p> <p>Negligible Impact</p> <p>Disruptive effects: no serious effects identified.</p> <p>Low Impact</p>	<p>Land required: 12.7ha; 23% of holding taken.</p> <p>Land take of this scale probably makes dairy enterprise unviable.</p> <p>High Impact</p> <p>Severance: No severance because land that would have been severed is taken for planting.</p> <p>Negligible Impact</p> <p>Infrastructure: water supply / drinking trough systems; restoration of drainage functionality; fencing; reconnection of electric ring main.</p> <p>Negligible Impact</p>
<p>CFA22/14</p> <p>Ravenshaw Wood (West)</p> <p>12.0ha of Woodland</p> <p>Low sensitivity to change</p>	<p>Land required: 3.6ha; 30% of holding required for construction.</p> <p>High Impact</p> <p>Severance: this is woodland that is not regularly managed at present. Necessary access will be arranged under CoCP.</p> <p>Low Impact</p> <p>Disruptive effects: none identified.</p> <p>Low Impact</p>	<p>Land required: 2.9ha; 24% of holding taken.</p> <p>High Impact</p> <p>Severance: assumes access via Ravenshaw Cottage access track, and access provision over CFA22-12 (Ravenshaw Wood, East).</p> <p>Negligible Impact</p> <p>Infrastructure: fencing.</p> <p>Negligible Impact</p>
<p>CFA22/15</p> <p>Hauchwood</p> <p>121.4ha of Mixed arable and livestock</p> <p>High sensitivity to change</p>	<p>Land required: 16.5ha; 14% of holding required for construction.</p> <p>Medium Impact</p> <p>Severance: NW parcel that would have been severed is taken for construction activity. Assume that access from A515 over Bourne Brook will be provided under CoCP.</p> <p>Medium Impact</p> <p>Disruptive effects: safety requirements of construction site will curtail commercial shoot. Note disruption caused by closure of Shaw Lane.</p> <p>High Impact</p>	<p>Land required: 11.6ha; 10% of holding taken.</p> <p>Low Impact</p> <p>Severance: assume that access from A515 over Bourne Brook will be provided.</p> <p>Medium Impact</p> <p>Infrastructure: reinstatement of abstraction point and water supply / drinking trough systems; restoration of drainage functionality; fencing; access provisions (including watercourse crossing).</p> <p>Low Impact</p>

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA22/16</p> <p>Brownfields Farm</p> <p>283.3ha of Mixed arable and livestock</p> <p>High sensitivity to change</p>	<p>Land required: 21.3ha; 8% of holding required for construction.</p> <p>Low Impact</p> <p>Severance: holding is severed by construction. Access to southern parcel off Woodend Lane. Assume access to northern parcel can be provided under CoCP off Wharf Farm access track.</p> <p>Medium Impact</p> <p>Disruptive effects: Low Impact</p>	<p>Land required: 16.7ha; 6% of holding taken.</p> <p>Low Impact</p> <p>Severance: holding is severed by Hs2. Southern parcel accessible off Woodend Lane. Northern parcel accessible off A515 and access track near Wharf Farm.</p> <p>Medium Impact</p> <p>Infrastructure: reinstatement of water supply / drinking trough systems; restoration of drainage functionality; fencing; access provisions.</p> <p>Low Impact</p>
<p>CFA22/17</p> <p>Hunts Farm</p> <p>32.4ha of Mixed arable and livestock</p> <p>Medium sensitivity to change</p>	<p>Land required: 17.6ha; 54% of holding required for construction.</p> <p>High Impact</p> <p>Severance: no new severance, however new access points may be required to accommodate construction areas.</p> <p>Negligible Impact</p> <p>Disruptive effects: Note disruption caused by closure of Shaw Lane.</p> <p>Low Impact</p>	<p>Land required: 4.2ha; 13% of holding taken.</p> <p>Medium Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Infrastructure: restoration of drainage functionality; fencing; access provision (including watercourse crossing).</p> <p>Low Impact</p>
<p>CFA22/18</p> <p>New Farm, Elmhurst</p> <p>33.1ha of Horticulture – fruit grower</p> <p>High sensitivity to change</p>	<p>Land required: 5.8ha; 17% of holding required for construction.</p> <p>Medium Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Disruptive effects: high value crops potentially sensitive to dust damage.</p> <p>Medium Impact</p>	<p>Land required: 3.2ha; 10% of holding taken.</p> <p>Low Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Infrastructure: loss of buildings (inc. poly tunnels); potential reinstatement of abstraction point / water mains ; restoration of drainage functionality.</p> <p>High Impact</p>
<p>CFA22/19</p> <p>Ashton Hayes Farm</p> <p>16.2ha of Mixed arable and livestock</p> <p>Medium sensitivity to change</p>	<p>Land required: 4.5ha; 28% of holding required for construction.</p> <p>High Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Disruptive effects: Note disruption caused by closure of Shaw Lane.</p> <p>Low Impact</p>	<p>Land required: 4.4ha; 27% of holding taken.</p> <p>High Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Infrastructure: restoration of drainage functionality.</p> <p>Low Impact</p>

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA22/20</p> <p>Tuppenhurst Field</p> <p>6.9ha of General cropping (cereals and potatoes)</p> <p>Medium sensitivity to change</p> <p>(farmed in conjunction with CFA22/15 and CFA22/17)</p>	<p>Land required: 5.5ha; 79% of holding required for construction (Harvey's Rough Flyover Compound).</p> <p>High Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Disruptive effects: Note disruption caused by closure of Shaw Lane.</p> <p>Low Impact</p>	<p>Land required: 5.0ha; 72% of holding taken for mitigation planting.</p> <p>High Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Infrastructure: restoration of drainage functionality; fencing; access provision.</p> <p>Low Impact</p>
<p>CFA22/21</p> <p>Tuppenhurst Farm</p> <p>303.5ha of Mainly arable</p> <p>Medium sensitivity to change</p>	<p>Land required: 0.2ha; <1% of holding required for construction.</p> <p>Negligible Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Disruptive effects: Note disruption caused by closure of Shaw Lane.</p> <p>Low Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Infrastructure: restoration of drainage functionality; fencing; access provision.</p> <p>Low Impact</p>
<p>CFA22/24*</p> <p>Brokendown Wood</p> <p>4.0ha of Woodland</p> <p>Medium sensitivity to change</p>	<p>Land required: 1.1ha; 28% of holding required for construction.</p> <p>High Impact</p> <p>Severance: this is woodland. Necessary access will be arranged under CoCP.</p> <p>Low Impact</p> <p>Disruptive effects:</p> <p>Low Impact</p>	<p>Land required: 1.1ha; 28% of holding taken.</p> <p>High Impact</p> <p>Severance: access provided under Trent & Mersey Canal East Viaduct.</p> <p>Low Impact</p> <p>Infrastructure: fencing and access provision.</p> <p>Negligible Impact</p>
<p>CFA22/25*</p> <p>Thatchmore Farm</p> <p>71.7ha of Mainly arable</p> <p>Medium sensitivity to change</p>	<p>Land required: 5.8ha; 8% of holding required for construction (overhead cable works).</p> <p>Low Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Disruptive effects:</p> <p>Low Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Infrastructure:</p> <p>Drainage: None.</p> <p>Negligible Impact</p>
<p>CFA22/26*</p> <p>Land south of Thatchmore Farm A</p> <p>3.5ha of Equestrian (commercial)</p> <p>Medium sensitivity to change</p>	<p>Land required: 0.0ha; 0% of holding required for construction.</p> <p>Negligible Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Disruptive effects:</p> <p>Low Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Infrastructure: no impact identified</p>

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA22/27*</p> <p>Land on NE side of Marsh Lane</p> <p>1.9ha of Mainly livestock (Sheep)</p> <p>Medium sensitivity to change</p>	<p>Land required: 0.4ha; 20% of holding required for construction. High Impact</p> <p>Severance: no new severance (see notes on access under infrastructure). Low Impact</p> <p>Disruptive effects: none identified. Low Impact</p>	<p>Land required: 0.4ha; 20% of holding taken. High Impact</p> <p>Severance: no new severance (see notes on access under infrastructure). Low Impact</p> <p>Infrastructure: realignment of access track; reinstatement of drainage functionality. Negligible Impact</p>
<p>CFA22/28</p> <p>Whittington Hill Farm</p> <p>4.5ha of Equestrian (non-commercial)</p> <p>Low sensitivity to change</p>	<p>Land required: 2.6ha; 58% of holding required for construction. High Impact</p> <p>Severance: no severance because land that would have been severed is taken for construction activity. Negligible Impact</p> <p>Disruptive effects: effect of noise on horses. Medium Impact</p>	<p>Land required: 2.6ha; 58% of holding taken. High Impact</p> <p>Severance: no severance because land that would have been severed is taken for ecological mitigation and permanent planting. Negligible Impact</p> <p>Infrastructure: reinstatement of water supply / drinking trough systems; restoration of drainage functionality; fencing; access provisions. Low Impact</p>
<p>CFA22/29</p> <p>Vicars Coppice</p> <p>7.7ha of Woodland</p> <p>Low sensitivity to change</p>	<p>Land required: 0.4ha; 6% of holding required for construction. Low Impact</p> <p>Severance: no new severance. Negligible Impact</p> <p>Disruptive effects: none identified. Low Impact</p>	<p>Land required: 0.2ha; 3% of holding taken. Negligible Impact</p> <p>Severance: no new severance. Negligible Impact</p> <p>Infrastructure: no infrastructure issues identified. Negligible impact</p>
<p>CFA22/30</p> <p>Fradley Wood</p> <p>43.5ha of Woodland</p> <p>Low sensitivity to change</p>	<p>Land required: 1.6ha; 4% of holding required for construction. Negligible Impact</p> <p>Severance: no new severance. Negligible Impact</p> <p>Disruptive effects: none identified. Low Impact</p>	<p>Land required: 1.6ha; 4% of holding taken. Negligible Impact</p> <p>Severance: no new severance. Negligible Impact</p> <p>Infrastructure: restoration of drainage functionality; fencing Negligible Impact</p>
<p>CFA22/31*</p> <p>Land adjacent to Fulfen Farm</p> <p>3.4ha of Grassland</p> <p>Medium sensitivity to change</p>	<p>Land required: 0.0ha; <1% of holding required for construction. Negligible Impact</p> <p>Severance: no new severance. Negligible Impact</p> <p>Disruptive effects: none identified. Negligible Impact</p>	<p>Land required: 0.0ha; 0% of holding taken. Negligible Impact</p> <p>Severance: no new severance. Negligible Impact</p> <p>Infrastructure: reinstatement of water supply / drinking trough systems; restoration of drainage functionality; fencing. Negligible Impact</p>

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA22/32*</p> <p>Land adjacent to Easthill House</p> <p>2.5ha of Woodland</p> <p>Medium sensitivity to change</p>	<p>Land required: 1.3ha; 54% of holding required for construction.</p> <p>High Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Disruptive effects: none identified.</p> <p>Low Impact</p>	<p>Land required: 1.3ha; 54% of holding taken.</p> <p>High Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Infrastructure: restoration of drainage functionality; fencing; access provision.</p> <p>Negligible Impact</p>
<p>CFA22/33*</p> <p>Land south of Thatchmore Farm B</p> <p>7.4ha of Grassland</p> <p>Medium sensitivity to change</p>	<p>Land required: 1.8ha; 24% of holding required for construction (overhead cables).</p> <p>High Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Disruptive effects:</p> <p>Low Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Infrastructure: reinstatement of water supply / drinking trough systems; fencing.</p> <p>Negligible Impact</p>
<p>CFA22/34*</p> <p>Land off Broad Lane</p> <p>7.6ha of Mixed arable and livestock</p> <p>Medium sensitivity to change</p>	<p>Land required: 3.5ha; 47% of holding required for construction (overhead cables).</p> <p>High Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Disruptive effects:</p> <p>Low Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: no new severance.</p> <p>Negligible Impact</p> <p>Infrastructure: reinstatement of water supply / drinking trough systems; fencing.</p> <p>Negligible Impact</p>
<p>CFA22-35*</p> <p>Bearshay Farm</p> <p>61 ha of Mainly arable and some grassland</p> <p>Medium sensitivity to change</p>	<p>Land required: 7.7ha; 13% of holding required for construction.</p> <p>Medium Impact</p> <p>Severance: parcel to SE severed from rest of holding by closing off of underpass beneath existing railway.</p> <p>High Impact</p> <p>Disruptive effects: none identified.</p> <p>Low Impact</p>	<p>Land required: 0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance none (underpass beneath existing railway restores access to severed SE parcel).</p> <p>Negligible Impact</p> <p>Infrastructure: restoration of drainage functionality.</p> <p>Negligible Impact</p>
<p>CFA22/36</p> <p>Land adjacent to Rileyhill Farm</p> <p>23.1ha of General cropping (cereals and potatoes)</p> <p>Medium sensitivity to change</p>	<p>Land required: 0.7ha; 3% of holding required for works associated with pylons.</p> <p>Negligible Impact</p> <p>Severance: if access to temporarily severed land is essential, this can be managed through CoCP.</p> <p>Low Impact</p> <p>Disruptive effects: none identified.</p> <p>Negligible Impact</p>	<p>Land required: no land required once works completed.</p> <p>Negligible Impact</p> <p>Severance: none - assume no additional ground based infrastructure is installed.</p> <p>Negligible Impact</p> <p>Infrastructure: gateways; fencing.</p> <p>Negligible Impact</p>

Holding reference, name and description	Construction effects	Residual effects post restoration of land
<p>CFA22/37*</p> <p>Land on the south side of Darnford Lane</p> <p>2.6ha of Grassland</p> <p>Medium sensitivity to change</p>	<p>Land required: 1.8ha; 69% of holding required for works associated with pylons. This scale of land take is a worst case estimate since access requirements will probably be limited to wayleaves.</p> <p>High Impact (worst case prediction)</p> <p>Severance: if access to temporarily severed land is essential, this can be managed through CoCP.</p> <p>Low Impact</p> <p>Disruptive effects: none identified.</p> <p>Negligible Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: none - assume no additional ground based infrastructure is installed.</p> <p>Negligible Impact</p> <p>Infrastructure: gateways; fencing.</p> <p>Negligible Impact</p>
<p>CFA22/38*</p> <p>Land lying to the North of Tamworth Road</p> <p>9.1ha of Mainly livestock (suckler cows)</p> <p>Medium sensitivity to change</p>	<p>Land required: 3.1ha; 34% of holding required for works associated with pylons. This scale of land take is a worst case estimate since access requirements will probably be limited to wayleaves.</p> <p>High Impact</p> <p>Severance: if access to temporarily severed land is essential, this can be managed through CoCP.</p> <p>Low Impact</p> <p>Disruptive effects: none identified.</p> <p>Low Impact</p>	<p>Land required: 0.0ha; 0% of holding taken.</p> <p>Negligible Impact</p> <p>Severance: none - assume no additional ground based infrastructure is installed.</p> <p>Negligible Impact</p> <p>Infrastructure: gateways; fencing</p> <p>Negligible Impact</p>

* No farm impact assessment interview conducted; data estimated.

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